Enterprise and Work Innovation Studies

Characterization of Cleaners Accidents in the Portuguese Service Sector

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ABSTRACT

This paper characterizes work accidents at Portuguese industrial cleaning companies, operating in the service sector, through the application of ESAW methodology. Data was codified based on the analysis of 748 accident claims to insurance companies (number of days lost ≥1 working day) in 3 large industrial cleaning companies for the period 2001-2003. Slipping and falling in the same level was the main deviation from the normal working process in the moment of the accident (in 25% of the accidents); uncoordinated movements was the second cause of accidents (14%); falls of persons to a lower level was the third cause of accidents (~10%), including falls from stairs (~7%) and falls from ladders and mobile ladders (~2%); globally, body movement under or with physical stress, including lifting, carrying, putting down, bending down, twisting, turning, trading badly, twisting leg or ankle and slipping without falling, were the cause in 17% of the accidents. Lower limbs were injured in ~25% of the accidents, hand and fingers in ~14%, the eye in ~4% and the back in ~9% of the accidents. An incidence rate of 3,580 accidents/100,000 employees was found to the sector (2003 data).

Keywords: industrial cleaning, Portugal; work accidents; working conditions

JEL codes: J28; J81; L84

INTRODUCTION

The Portuguese cleaning sector

It is estimated a total number of 1.100 cleaning companies, classified under NACE code K.74.70 - Industrial cleaning, with a total workforce of 42,500 employees (Dun & Bradstreet Portugal, 2003 data, unpublished). In the period 2001-2003 a decrease of 14% was observed in the workforce (INE, 2005).

The average number of employees per company is 39.9; ~78% of the companies have less than 10 employees (~89% have less than 50 employees and ~94% have less than 250 employees) (Dun & Bradstreet Portugal, 2003 data, unpublished). The average age of cleaning operators was 41.7 years (~28% with an age ≥ 50 years). Women constitute 92.0% of the workforce (DGEEP - Direcção-Geral de Estudos, Estatística e Planeamento, 2003 data, unpublished; Cabeças et al., 2007).

A high turnover is observed in the in the cleaning sector; ~36% of the employees have a seniority less than 1 year (~18% have a seniority between 1-2 years). Workers from ethnic minorities and migrant workers represented 21.7% of the workforce. The majority of migrant workers are from PALOP - African Countries of Portuguese Official Language countries (3/4 migrant workers) (DGEEP - Direcção-Geral de Estudos, Estatística e Planeamento, 2003 data, unpublished).

The average duration of work, according to employer's reports, was 29.5 hours/week (~38% of workers had 40 hours/week). However, considering that cleaners often work to several employers, the average daily working hours was 8.3 (3.2-20.0; SD=2.7; sampling of 114 employees); 36% of the employees (n=114) worked more than 50 hours a week (only 1/3 of the workers worked less than 40 hours/week) (Cabeças et al., 2007).

Each cleaning worker lost an average of 130 working hours (~18 working days) due to absenteeism during 2003; 57% of the lost time is due to sickness absenteeism and occupational injuries. Sickness absenteeism represents ~53% of lost time and absenteeism due to occupational injuries represents ~4% of lost time. The absenteeism indicator due to health and accidents at work was 6% (the global absenteeism was 10%) (Cabeças et al., 2007).

Accidents in the cleaning sector

Accidents data in the cleaning sector is not profuse in the literature. An analysis of major accidents to cleaners in U.K. (2003-2006) revealed that slips and trips and manual handling are the most common types of accidents (in major accidents and in accidents over 3 days) (HSE, 2007a).

Unpublished workers' compensation data for workers in Washington industrial class codes related to janitorial, housekeeping and custodial work (2003 data), by the Department of Labor and Industries (Goggins, 2007), revealed that overexertion (28% of claims), struck by and against (22% of claims) and falls (17% claims) are most frequent cause of injury and illness claims among cleaning workers.

A report from IKK concerning glass cleaners and building cleaners in Germany (IKK-

Bundesverband, 2005), revealed that cleaning activities in these specific work places may have a high risk to health problems (5.3% of sick persons during the period 1997-2005) than cleaning activities in the health and business sectors (3.9%) and also in all the IKK statutory insure employed persons (4.1%). The average duration of seek leave is also higher in glass cleaners and building cleaners (15.2 days per employee) comparatively to health and business cleaning sectors (12.2 days) and in IKK entirely (12.0 days).

Experts suggest that there is a high percentage of under or non-reporting of accidents and health problems (Leigh et al., 2004). A study involving 941 hotel cleaners (Scherzer et al., 2005), revealed that two thirds of the workers did not report to management work-related pain, considered severe enough for most workers to seek medical attention or take days off to the management and; also, 18% of the workers who had a work-related injury at some time did not file a claim with workers' compensation.

Accidents control measures in the cleaning sector

Several documents related to accident control measures in the cleaning sector may be found in the literature. A manual for employees (Munar and Lebeer, 2000), prepared under the supervision of the partners in the social dialogue in the cleaning sector (FENI/EFCI and UNI-Europa), contains information in order to identify the risks in the cleaning work and also sets out ways to guard against such risks or to deal with their consequences.

Slips and trips are one of the most important causes of accidents in the cleaning sector; particular recommendations are addressed to by the literature (Corbett and Miller, 2006; Faergemann and Larsen, 2001; HSE, 2007a).

Extensive recommendations regarding accident prevention in the cleaning sector may be found at Health and Safety Executive (2007b). Interesting good practice guides may be found at GMB (2005), UNISON (2000), WorkCover Tasmania Board (2004) and Institut National de Recherche et de Sécurité (2005). A guide to risk management was published by the Queensland Government (1998). The American Society for Safety Engineers published an article referring strategies for reducing exposures to ergonomic risk factors (Goggins, 2007), also applicable to accidents risk factors (particularly handling trash and moving furniture).

Vocational training of employees has been recognized as an important measure to promote professionalism in the sector and to improve the health and safety of employees (European Commission, 2004). An Industrial Cleaning Training Kit was

prepared by UNI-Europa and EFCI (2003). A training manual prepared by EFCI and AMU International presents an outline on the structure and essential ingredients needed to build curricula in cleaning services to individuals (Pedersen and Petersen, 2000).

Common recommendations of the E.U. social partners for the cleaning industry (EFCI and UNI-Europa) were addressed to cleaning companies, employees, clients and to public authorities (European Commission, 2004). Some of the recommendations may have an impact in the safety of employees: promoting full-time work and daytime work, promoting professionalism in the sector, encouraging the development of healthy competition, promoting employee retention, rendering the sector more attractive and improving the health and safety of employees.

Introduction to the ESAW - European Statistics on Accidents at Work methodology

The ESAW methodology was applicable in this study to describe accidents in Portuguese cleaning operations, during the period 2001-2003, covering accidents claimed by the employer to the insurance company, with a number of days lost ≥ 1 working day (however in the large majority of accidents, the number of days lost were > 3 days). Data was collected during 2004-2005 and analyzed during 2005-2006. Two groups of variables were used to characterize accidents in this work sector:

1. Variables to describe the sequence of events: the specific physical activity of the victims and material agent associated, the deviation and material agent associated and the contact – mode of injury and material agent associated, and

2. Variables to describe the victim: the type of injury and the body part injured.

THE METHODOLOGY

Data presented in this article was obtained, through the analysis of 748 work accidents claims to insurance companies (Portuguese Decree-Law no. 362/93), during the period 2001-2003, in 3 large industrial cleaning companies operating in Portugal (Table 1). Data includes accidents with a number of days lost ≥ 1 working day.

Table 1: The sampling of cleaning companies to which insurance claims were codified

Company Code	Number of employees (2003)	Number of accidents (period 2001-03)	Number of insurance claims codified
CLE-S	~1,500	327	327
CLE-I	~2,000	279	253
CLE-C	~4,000	252	168
Total	~7,500	858	748

Considering 42,477 employees in the Portuguese cleaning sector (Dun & Bradstreet Portugal, 2003 data, unpublished) and estimating ~1,520 work accidents in 2003 (Cabeças et al., 2007), data presented in this article represents a sampling of ~18 % of the employees and ~50 % of the yearly accidents of the sector in Portugal.

The selected cleaning companies operate mainly in the service sector, including office cleaning, in the public sector, banks and insurance companies and cleaning in the education and catering sectors. Cleaning activities in the health sector, domestic cleaning, windows cleaning, workshop cleaning like parts cleaning, degreasing, and maintenance work, and street cleaning are not included in this article. The article covers essentially cleaning activities classified as Traditional cleaning services under the code NACE 74.70.13 (Council Regulation EEC No 3696/93).

Selected information from the form claims (related to the causes and consequences of the accidents) was directly transposed to a database; the different accident variables were later codified accordingly to ESAW methodology, and statistical calculations performed to the different variables. Data not printed in the form claims (empty fields), was included under ESAW codes *no information, unknown or unspecified*. In some cases, the information printed in the form claims concerning the characteristics of the accidents was clarified with interviews in the cleaning companies.

RESULTS

The accidents incidence rate

Considering the yearly number of employed persons and the number of accidents (with a number of days lost ≥ 1 working day) in the cleaning companies referred to in Table 1, for the period 2001-2003, an average incidence rate of 4,379 accidents / 100,000 employees (2,663-8,250) was obtained. For the 3 years period, commuting accidents represented an average of 8.4% of the total number of accidents.

This number differs from the average incidence rate for the year 2003, calculated in

40 Portuguese cleaning companies employing more than 100 workers (a sampling of 73% of cleaning workers) (DGEEP - Direcção-Geral de Estudos, Estatística e Planeamento, 2003 data, unpublished; Cabeças et al. 2007). Considering accidents with and without lost days, an incidence rate of 3,580 accidents / 100,000 employees was obtained, including 6.5% of commuting accidents.

The victims

The percentage of female workers in the Portuguese cleaning sector is ~92% with an average age of 41.7 years (DGEEP - Direcção-Geral de Estudos, Estatística e Planeamento, 2003 data, unpublished; Cabeças et al. 2007). Female workers represented the large majority of the victims (80.2%; 1.1% unknown). The average age of the victims was 41.5 years (SD=11.8; 19-67) and the seniority in the company in the date of the accident was 19.9 months (SD=24.7; 0-256.4). Most part of the victims had a Portuguese nationality (81.0%, 3.7% unknown).

The activity of the victims in the time of the accident

The *Working Process* variable describes the basic type of work (the broad, general task) being performed by the victim at the time of the accident (Table 2).

Table 2: The working process performed by the victims at the time of the accident

ESAW code	Working process	Accidents (%) (n=748)
0	No information	5.4
31	Agricultural type work - working the land	0.4
53	Cleaning working areas, machines - industrial or manual	85.4
61	Movement, including aboard means of transport	8.8
	Total	100.0

The *Specific Physical Activity* represents precisely what the victim was doing at the exact time of the accident. It covers only a short period of time (Table 3).

Table 3: The Specific Physical Activity of the victims in the time of the accident

ESAW code	Specific Physical Activity	Accidents (%) (n=748)
0	No information	6.1
21	Working with hand-held tools – manual	38.6
61	Walking, running, going up, going down, etc.	14.2
46	Pouring, pouring into, filling up, watering, spraying, emptying, baling out	7.4
51	Carrying vertically - lifting, raising, lowering an object	7.1
13	Monitoring the machine, operating or driving the machine,	4.3
52	Carrying horizontally - pulling, pushing, rolling an object	3.7
	Total	81.4

The *Material Agent* of the *Specific Physical Activity* describes the tool, object, or instrument being used by the victim when the accident happened. The Material Agent may or may not be implicated in the accident (Table 4).

Table 4: The Material Agent of the Specific Physical Activity of the victims in the time of the accident

ESAW code	Material Agent of the Specific Physical Activity	Accidents (%) (n=748)
00.02	No information	6.4
06.10	Hand tools, not powered - for cleaning	36.0
00.01	No material agent	19.5
11.09	Miscellaneous packaging, small and medium-sized, mobile (skips, miscellaneous containers, bottles, crates, extinguishers...)	10.4
09.04	Mobile floor cleaning machines	4.3
15.01	Substances - caustic, corrosive (liquid)	3.7
11.04	Mobile handling devices (not powered)	2.4
	Total	82.8

The event that triggers the accident

The *Deviation* is the last event deviating from the normal working process that leaded to the accident (Table 5).

Table 5: The Deviation from the normal working process in the time of the accident

ESAW code	Deviation from the normal working process	Accidents (%) (n=748)
00	No information	9.1
52	Slipping - Stumbling and falling - Fall of person - on the same level	25.0
64	Uncoordinated movements, spurious or untimely actions	14.0
51	Fall of person - to a lower level	10.3
75	Treading badly, twisting leg or ankle, slipping without falling	6.7
44	Loss of control (total or partial) - of object (being carried, moved, handled, etc.)	6.6
71	Lifting, carrying, standing up	5.9
22	Liquid state - leaking, oozing, flowing, splashing, spraying	4.4
	Total	82.0

The *Material Agent* of the *Deviation* describes the tool, object, or instrument involved in the abnormal event (Table 6).

Table 6: The Material Agent Deviation from the normal working process in the time of the accident

ESAW code	Material Agent of the Deviation from the normal working process	Accidents (%) (n=748)
00.02	No information	9.9
00.01	No material agent	21.3
01.02	Surfaces at ground level - ground and floors (indoor or outdoor, slippery floors, cluttered floors)	15.1
15.08	Substances, materials - with no specific risk (water)	8.8
02.02	Structures, surfaces, above ground level - fixed (including gangways, fixed ladders, pylons)	8.4
11.09	Miscellaneous packaging, small and medium-sized, mobile (skips, miscellaneous containers, bottles)	4.8
15.01	Substances - caustic, corrosive (liquid)	4.3
02.03	Structures, surfaces, above ground level - mobile (including scaffolding, mobile ladders)	3.3
19.01	Bulk waste - from raw materials, products, materials, objects	2.5
06.10	Hand tools, not powered - for cleaning	2.1
17.01	Furniture	2.0
	Total	82.5

The contact that injured the victim

The *Contact - Mode of injury* describes how the victim was hurt (physical or mental trauma) by the Material Agent that caused the injury (Table 7).

Table 7: The Contact - Mode of injury of the victims in the time of the accident

ESAW code	Contact - Mode of injury of the victims in the time of the accident	Accidents (%) (n=748)
00	No information	8.0
31	Vertical motion, crash on or against (resulting from a fall)	37.3
71	Physical stress - on the musculoskeletal system	17.0
32	Horizontal motion, crash on or against	7.5
51	Contact with sharp Material Agent (knife, blade etc.)	5.7
42	Struck - by falling object	5.5
52	Contact with pointed Material Agent (nail, sharp tool etc.)	1.2
	Total	82.2

The *Material Agent* of the *Contact - Mode of injury* is the principal material agent associated or linked with the injuring contact. Refers to the object, tool, or instrument with which the victim came into contact or the psychological mode of injury (Table 8).

Table 8: The Material Agent of the Contact - Mode of injury of the victims in the time of the accident

ESAW code	Material Agent of the Contact - Mode of injury in the time of the accident	Accidents (%) (n=748)
00.02	No information	8.0
01.02	Surfaces at ground level - ground and floors (indoor or outdoor, farmland, sports fields, slippery floors, cluttered floors, plank with nails in)	34.2
00.01	No material agent	17.6
01.01	Building components, structural components - doors, walls, partitions etc. and intentional obstacles (windows, etc.)	5.5
15.01	Substances - caustic, corrosive (solid, liquid or gaseous)	4.9
17.01	Furniture	3.7
14.05	Particles, dust, splinters, fragments, splashes, shards, other debris	3.5
14.02	Vehicle (public transport) components: doors, windows, etc.	2.4
06.14	Hand tools, not powered - for medical and surgical work - sharp, cutting	0.8
	Total	80.6

The nature and seriousness of the injuries

The *Type of injury* describes the physical consequences of the accident for the victim (Table 9).

Table 9: The type of injury in the victim

ESAW code	Type of injury	Accidents (%) (n=748)
000	Unknown or unspecified	36.4
032	Sprains and strains	13.0
012	Open wounds	12.2
011	Superficial injuries	12.0
021	Closed fractures	7.1
031	Dislocations and subluxations	5.0
050	Concussion and internal injuries	4.2
062	Chemical burns (corrosions)	2.9
052	Internal injuries	2.4
	Total	95.2

The *Part of the body injured* describes the victim's part of body site, which has been most seriously injured as a consequence of an accident (Table 10).

Table 10: The part of the body injured

ESAW code	Part of the body	Accidents (%) (n=748)
00	Part of body injured, not specified	9.9
64	Foot	13.4
62	Leg, including knee	11.2
31	Back, including spine and vertebra in the back	8.8
53	Hand	8.0
52	Arm, including elbow	7.7
54	Finger(s)	5.7
10	Head, not further specified	5.3
13	Eye(s)	4.3
51	Shoulder and shoulder joints	3.6
55	Wrist	3.1
99	Other Parts of body injured, not mentioned above	3.1
	Total	84.1

DISCUSSION

Data described as *no information, unknown or unspecified*, had an average value of 11.0% (5.4-36.4). The type of injury was the variable with the highest value of *unknown or unspecified* data (36.4%); the information related to the type of injury was omitted in the form claim of some accidents.

The Deviation from the normal working process in the time of the accident

Slipping - Fall of person - on the same level was responsible for 25% of the accidents; 6% of the accidents involved slipping and falling on the same level without any material agent (the cleaner was walking, going up or going down – ESAW code 61).

In 14% of the accidents, the cause was *Uncoordinated movements* (code 64), without any material agent associated to the deviation; most of the contacts occurred by *Horizontal motion, crash on or against* (code 32) involving the head, hand, arm, back, knee and feet.

In ~10% of the accidents, *Fall of person – to a lower level* (code 51) was the deviation that caused the accident; ~7% of the accidents involved falls from stairs, and ~2% involved falls from ladders and mobile ladders.

In ~7% of the accidents the deviation from the normal working process was *Treading badly, twisting leg or ankle, slipping without falling*; the feet was the part of the body injured in ~6% of the accidents; sprain and strain in the feet occurred in 4% of the accidents; any material agent during the activity was associated to these accidents.

In ~7% of the accidents, the deviation occurred by *Loss of control - of object (being carried, moved, handled, etc)*; several material agents existing in the workplace are associated to this deviation, namely manual and motorized tools, waste containers, tables, wall mounted boards, trolleys, steel and wood structures, ceramic plates, water hoses, windows and doors, etc.

Lifting, carrying, standing up was the working process deviation in ~6% of the

accidents; handling waste bags and sacks and waste containers occurred during ~4% of the accidents; *Dislocations and subluxations* (code 031) as well *Sprains and strains* (code 032) were the most frequent type of injuries in this type of deviation.

Globally, *Body movement under or with physical stress*, including lifting, carrying, putting down, bending down, twisting, turning, trading badly, twisting leg or ankle and slipping without falling (codes 70 to 75), were the deviation in 17.0% of the accidents.

Regarding the material agent deviation in the time of the accident, in ~21% of the accidents, *No material agents* was identified.

Surfaces at ground and floor level (dry surfaces) were present in ~15% of the accidents; *Slipping and falling on the same level* (code 52) were associated to all these accidents. The wet floor (water was the material agent of the accident) was present in ~9% of the accidents, all of them involving slipping and falling. As a consequence, slipping and falling in dry or wet floor was present in ~24% of the accidents.

Fixed ladders were identified in ~8% of the accidents; almost all the accidents classified under *Fall of person to a lower level* (code 51) resulted from slips and trips. Falls from mobile ladders were identified in ~3% of the accidents; been struck by a falling ladder was identified in five accidents. Globally, falls from fixed or mobile ladders happened in ~12% of the accidents, resulting in a contact –mode of injury classified as *Vertical motion, crash or agains*t (code 31).

Substances – caustic, corrosive were the material agent of the deviation in ~4% of the accidents; floor stripping products, sodium hydroxide (caustic soda) and hydrochloric acid are among the products involved in these accidents; *Chemical burns* (code 062) and *Acute poisoning* (code 071) are the type of injuries that resulted from these accidents; the eyes are the body part more often injured in these accidents (in 2.5% of the accidents with chemical burns).

Handling waste bags and sacks and portable water buckets were classified under *Miscellaneous packaging* (code 11.09); handling waste bags and sacks was present in 2.8% of the accidents and handling portable water buckets in 1.3% of the accidents.

The Contact that injured the victim

Vertical motion (resulting from a fall) is the most representative type of contact in the moment of the accident (~37% of the accidents) and results essentially from contact with *Surfaces at ground level* (ESAW code 01.02), and deviations code 51

(fall of person to a lower level) and code 52 (slipping – fall on the same level).

Physical stress – on the musculoskeletal system was the second more relevant mode of injury (17% of the accidents), resulting essentially from body movements under physical stress, in deviations code 71 (*Lifting, carrying*), code 75 (*Treading badly, twisting leg or ankle, slipping without falling*) and code 72 (*Pushing, pulling*); any material agent was associated to this type of contact, however the material agent of the activity in the time of the accident were non-powered hand tools (in 4.7% of the accidents), waste bags and sacks and portable water buckets (~3.7% of the accidents) and no material agent (in 3.1% of the accidents the cleaner was walking, going up, going down, etc.).

Horizontal motion, crash on or against was the contact modality in ~8% of the accidents; the large majority of these accidents resulted from a deviation code 64 (*Uncoordinated movements, spurious or untimely actions*) with *No material agent* of the deviation (code 00.01); most of these accidents involved horizontal and vertical motions of body parts (hand, feet, had, arm, etc) against hard components of the workplace, as windows, doors, machine parts, etc., resulting mainly in superficial injuries (code 011) and open wounds (code 012).

Contact with sharp material agent (knife, blade, etc.) was identified in ~6% of the accidents; glass fragments were the material agent of the contact most referred to; materials agents like splinters, fragments, shards, etc. (code 14.05) were the contact material in 2.3% of the accidents.

Been *Struck by falling object* was the contact mode in ~6% of the accidents, resulting essentially from deviations code 33 (*Slip, fall, collapse of Material Agent - from above*) and code 44 (*Loss of control - of object*); the material agent of the contact includes a large variety of items, like hard tools, steel parts, waste containers, movable ladders, wood pallets, etc.

The nature of the injuries

Sprains and strains, Open wounds and Superficial injuries, represent ~37% of the types of injuries in cleaners (in 36.4% of the accidents data was unspecified). *Sprains and strains* occurred essentially in the foot (in 7.2% of the accidents); *Open wounds* occur in different body parts, namely the head (in 2.0% of the accidents), the fingers (in 2.9% of the accidents) and the leg (in 1.2% of the accidents); *Superficial injuries* were also noticed in different body parts.

Chemical burns (corrosions) were referred to in ~3% of the accidents, mainly in the

eyes (9 accidents), in the hand (3 accidents) and in the head (2 accidents).

Dislocations and subluxations occurred essentially in the back (in 1.7% of the accidents) and in the arms and shoulders (in 1.5% of the accidents).

The *Foot* was the body part most injured (in 13.4% of the accidents), mainly due to *Sprains and strains* (in 7.2% of the accidents), *Superficial in*juries (in 1.6% of the accidents) and *Closed fractures* (in 1.1% of accidents).

Leg, including knee was injured in ~11% of the accidents, the type of injury were omitted in most of the accident claims.

The *Back, including spine and vertebra*, was injured in ~9% of the accidents; the exact type of injury was not clearly identified in the insurance claims, ranging from *Superficial injuries* to *Dislocations, sprains and strains* and to *Concussion and internal injuries*.

The *Hand* was injured in ~8% of the accidents mainly due to *Superficial injuries* and *Open wounds* (in 5% of the accidents).

CONCLUSIONS

Analyzing the causes and circumstances of accidents in the Portuguese cleaning sector, it was found that ~66% of the causes of accidents were related to slipping and falling, uncoordinated movements and to body movement under or with physical stress. The following conclusions may be drawn:

1. Slipping and falling in the same level was the main cause of accidents (25.0%); any material agent during the activity was present in 6.0% of accidents; hand tools not-powered were present in 14.2% of the accidents; surfaces at ground level were responsible for 14.8% of the accidents; wet floor was responsible for 8.3% of the accidents.

2. Uncoordinated movements was the second main cause of accidents (14.0%); different material agents were present during the activity, however, they were not directly involved in the accident; a large variety of circumstances were identified in the accidents: horizontal motions of the head, hand, arm, back, knee and feet against items in the workplace, contact with sharp materials (mostly during waste handling), been trapped by the hand or fingers in or between items in the workplace are the most representatives circumstances of these accidents.

3. Falls of persons to a lower level was the third main cause of accidents (10.3%), including falls from stairs (~7%) and falls from ladders and mobile ladders (~2%); the contact of the accident was by vertical motion of the cleaner against surfaces at ground level; different body parts were affected by these accidents.

4. Globally, body movement under or with physical stress, including lifting, carrying, putting down, bending down, twisting, turning, trading badly, twisting leg or ankle and slipping without falling, were the cause in 17.0% of the accidents.

The identification of the body parts injured as a consequence of accidents may be important in terms of defining adequate protection to cleaners during their occupational activities:

- Lower limbs were injured in 24.6% of the accidents (9.9% unspecified), particularly the foot (13.4%).

- Hand and fingers were injured in 13.7% of the accidents; open wounds and superficial injuries were identified in 9.1% of the accidents (3.3% unspecified).

- The eyes were injured in 4.3% of the accidents; chemical burns were identified in 1,2% of the accidents (1.9% unspecified).

- The back was injured in 8.8% of the accidents; concussions and internal injuries, as well dislocations, sprains and strains were identified in 5.3% of the accidents (2.7% unspecified); falls of cleaners on the same level or to a lower level was the cause identified in 4.4% of the accidents; lifting and carrying items in the workplace was the cause in 2.3% of the accidents; globally, handling loads and incorrect postures in the workplace (lifting, carrying, putting down, bending down, twisting, turning, trading badly, twisting leg or ankle) were the cause of 4,0% of the accidents with injuries in the back.

In qualitative terms, the conclusions of this study are aligned with the reported main causes and consequences of accidents in the sector (see paragraph 1.2). It must be emphasized that the actual study covers accidents with a number of days lost ≥ 1 working day.

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